Requirements for the Stability of Solenoid for LEBT
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LEBT consist of electrostatic lenses, and final magnetic solenoid for matching into the RFQ. To determine the power supply stability for this solenoid, Trace2d simulations were carried out with two solenoids LEBT. First step was find the matched condition required for RFQ. Second step was to change the solenoid field by ± 1%., and determine the MMF and Twiss parameters. Final step was using these Twiss parameters PARMTEQ run was med to see the emittance growth and transmission of the RFQ. Figure 1 shows the Trace2d out put showing matched conditions into the RFQ. Length of the solenoid was assumed 402.7 mm.

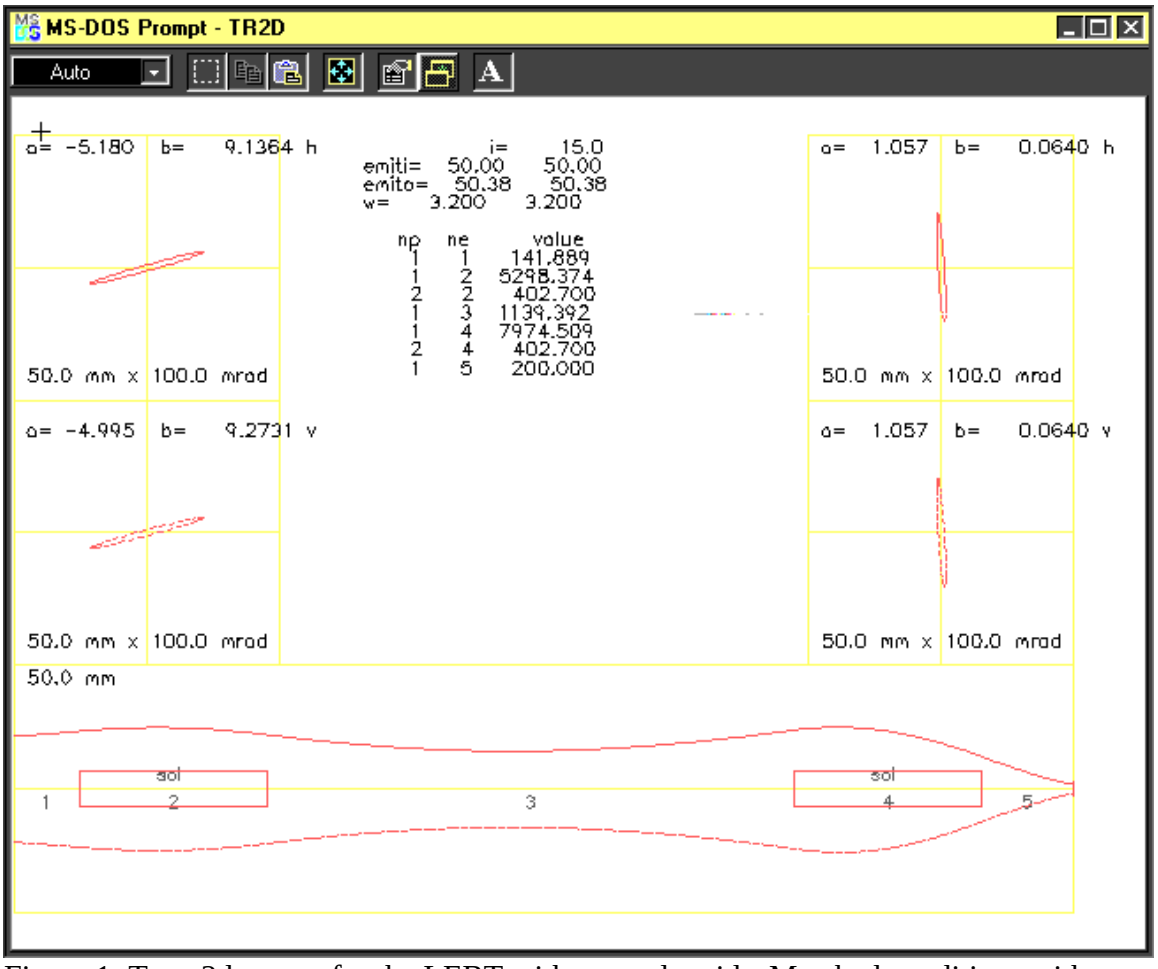

Figure 1: Trace2d output for the LEBT with two solenoids. Matched conditions with un-normalized emittance of 50 mm mrad for Au^{32} and solenoids filed and drift distances.

Changing the solenoid filed by ± 1%, MMF was about 0.240. This implies, the emittance growth of 30%. The Twiss parameters for +1% change in filed are α=0.578, β =0.043 and for -1% are α=1.547, β =0.0966. Using these values for input, PARMTEQ gives 3% lower transmission and about 5% emittance growth.

The stability of 1% for 1 ms long pulse under consideration seems sufficient for 10-40 μs pulse length for Au^{32}.